CLAIMS:

1. An arachidonic acid-containing plant produced by a process that comprises an arachidonic acid producing step in which fatty acid synthetase genes associated with the biosynthesis of arachidonic acid are introduced into a plant to produce arachidonic acid.

2. The arachidonic acid-containing plant as set forth in claim 1, wherein the arachidonic acid producing step includes a transforming step in which a recombinant expression vector containing genes encoding the fatty acid synthetases associated with the biosynthesis of arachidonic acid are introduced into a plant cell.

3. The arachidonic acid-containing plant as set forth in claim 2, wherein the arachidonic acid producing step further includes a recombinant expression vector constructing step of constructing a recombinant expression vector.

4. The arachidonic acid-containing plant as set forth in claim 3, wherein the recombinant expression vector constructing step includes a step in which the genes encoding the fatty acid synthetases associated with the biosynthesis of arachidonic acid are ligated downstream of

a soybean seed-specific promoter.

5. The arachidonic acid-containing plant as set forth in any one of claims 1 through 4, wherein the fatty acid synthetases associated with the biosynthesis of arachidonic acid are Δ6 desaturase, fatty-acid-chain elongase, and Δ5 desaturase.

6. The arachidonic acid-containing plant as set forth in claim 5, wherein the Δ6 desaturase is one of:

(a) a protein consisting of an amino acid sequence of SEQ ID NO: 1; and

(b) a protein, consisting of an amino acid sequence that has been modified by substitution, deletion, insertion, and/or addition of one or more amino acids of SEQ ID NO: 1, for catalyzing a reaction of introducing an unsaturated bond at position Δ6 of an aliphatic monocarboxylic acid.

7. The arachidonic acid-containing plant as set forth in claim 5, wherein the gene encoding the Δ6 desaturase is one of:

(c) a gene having a base sequence of SEQ ID NO: 2 as an open reading frame; and

(d) a gene that hybridizes under stringent conditions with a gene of a base sequence complementary to a base

sequence of a gene identified by SEQ ID NO: 2, and that encodes a protein which catalyzes a reaction of introducing an unsaturated bond at position Δ6 of an aliphatic monocarboxylic acid.

8. The arachidonic acid-containing plant as set forth in claim 5, wherein the fatty-acid-chain elongase is one of:

(e) a protein consisting of an amino acid sequence of SEQ ID NO: 3; and

(f) a protein, consisting of an amino acid sequence that has been modified by substitution, deletion, insertion, and/or addition of one or more amino acids of SEQ ID NO: 3, for catalyzing a reaction of elongating a carbon chain of an aliphatic monocarboxylic acid.

9. The arachidonic acid-containing plant as set forth in claim 5, wherein the gene encoding the fatty-acid-chain elongase is one of:

(g) a gene having a base sequence of SEQ ID NO: 4 as an open reading frame; and

(h) a gene that hybridizes under stringent conditions with a gene of a base sequence complementary to a base sequence of a gene identified by SEQ ID NO: 4, and that encodes a protein which catalyzes a reaction of elongating a carbon chain an aliphatic monocarboxylic acid.

10. The arachidonic acid-containing plant as set forth in claim 5, wherein the Δ5 desaturase is one of:

(i) a protein consisting of an amino acid sequence of SEQ ID NO: 5; and

(j) a protein, consisting of an amino acid sequence that has been modified by substitution, deletion, insertion, and/or addition of one or more amino acids of SEQ ID NO: 5, for catalyzing a reaction of introducing an unsaturated bond at position Δ5 of an aliphatic monocarboxylic acid.

11. The arachidonic acid-containing plant as set forth in claim 5, wherein the gene encoding the Δ5 desaturase is one of:

(k) a gene having a base sequence of SEQ ID NO: 6 as an open reading frame; and

(l) a gene that hybridizes under stringent conditions with a gene of a base sequence complementary to a base sequence of a gene identified by SEQ ID NO: 6, and that encodes a protein which catalyzes a reaction of introducing an unsaturated bond at position Δ5 of an aliphatic monocarboxylic acid.

12. The arachidonic acid-containing plant as set forth in any one of claims 1 through 11, wherein the fatty acid synthetases associated with the biosynthesis of

arachidonic acid, or the genes encoding the fatty acid synthetases are derived from *Mortierella*.

13. The arachidonic acid-containing plant as set forth in any one of claims 1 through 12, wherein the fatty acid synthetases associated with the biosynthesis of arachidonic acid, or the genes encoding the fatty acid synthetases are derived from *Mortierella alpina*.

14. The arachidonic acid-containing plant as set forth in any one of claims 1 through 13, wherein the arachidonic acid producing step includes an expression suppressing step of suppressing expression of a Δ15 desaturase in a host.

15. The arachidonic acid-containing plant as set forth in any one of claims 1 through 14, wherein, in the expression suppressing step, expression of the Δ15 desaturase is suppressed by an RNAi method.

16. The arachidonic acid-containing plant as set forth in any one of claims 1 through 15, wherein the plant comprises a plant cell, a plant tissue, a plant callus, a plant seed, a grown plant individual, or offspring of a plant individual having the same trait as the grown plant

individual.

17. The arachidonic acid-containing plant as set forth in any one of claims 1 through 16, wherein the plant comprises a soybean.

18. Arachidonic acid obtained from the arachidonic acid-containing plant of any one of claims 1 through 17.

19. A composition which comprises the arachidonic acid of claim 18.

20. Food which comprises the composition of claim 19.

21. An arachidonic acid-containing plant preparation kit for preparing the arachidonic acid-containing plant of any one of claims 1 through 17, comprising:

a recombinant expression vector including a promoter and genes encoding fatty acid synthetases associated with the biosynthesis of arachidonic acid.

22. The arachidonic acid-containing plant preparation kit as set forth in claim 21, further comprising a set of reagents for introducing the

recombinant expression vector into a plant cell.